

Heirloom Project



classic Chippendale Chest

Pleasing proportions, perfect details, and a healthy dose of challenging woodworking add up to a great project on every level.

As this project began to take shape, a word came to mind that sent me to the dictionary. Webster's defines the word "classic" as "of enduring style, interest, or quality." And when those criteria are applied to this handsome chest of drawers, it's pretty easy to make a good argument for all three.

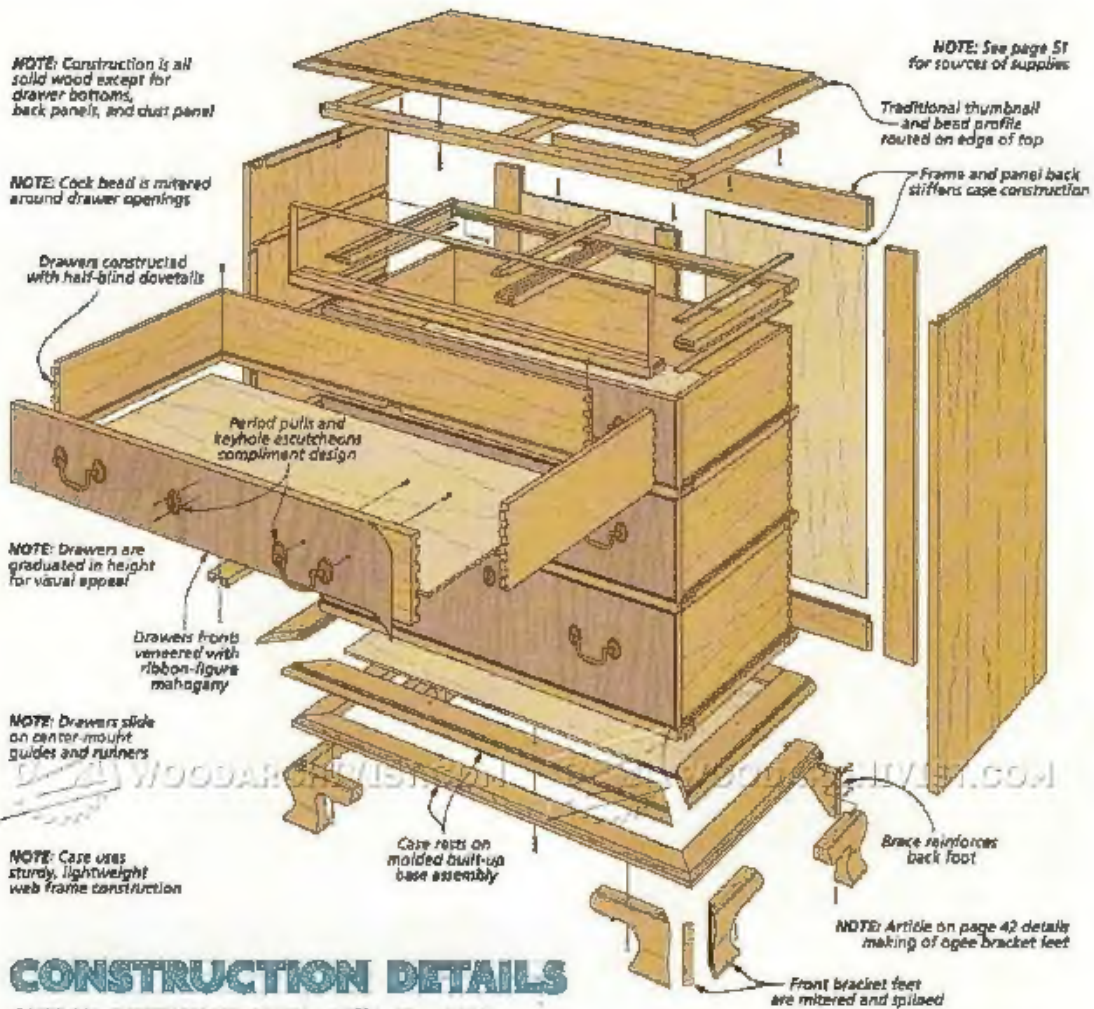
The enduring style is pretty plain to see. The graceful moldings, veneered drawer fronts in

their beaded openings, and ogee bracket feet are all spot-on period details. Thomas Chippendale would no doubt approve.

However, this is only what you see on the surface. For a woodworker, the interest comes from the skills and techniques needed to build such a masterpiece. And in this respect, the old and new come together. Although most of the tools and techniques you'll need to

use are thoroughly modern, much of the construction and joinery is a nod to another time. Tackling this project is guaranteed to teach you a thing or two and take your woodworking to a new level.

And what's the end result of all this fine craftsmanship? Well that's easy. The answer is an heirloom-quality chest that you'll be proud to show off and pass down through the generations.



CONSTRUCTION DETAILS

OVERALL DIMENSIONS: 39"W x 20¹¹/₁₆"D x 39"H



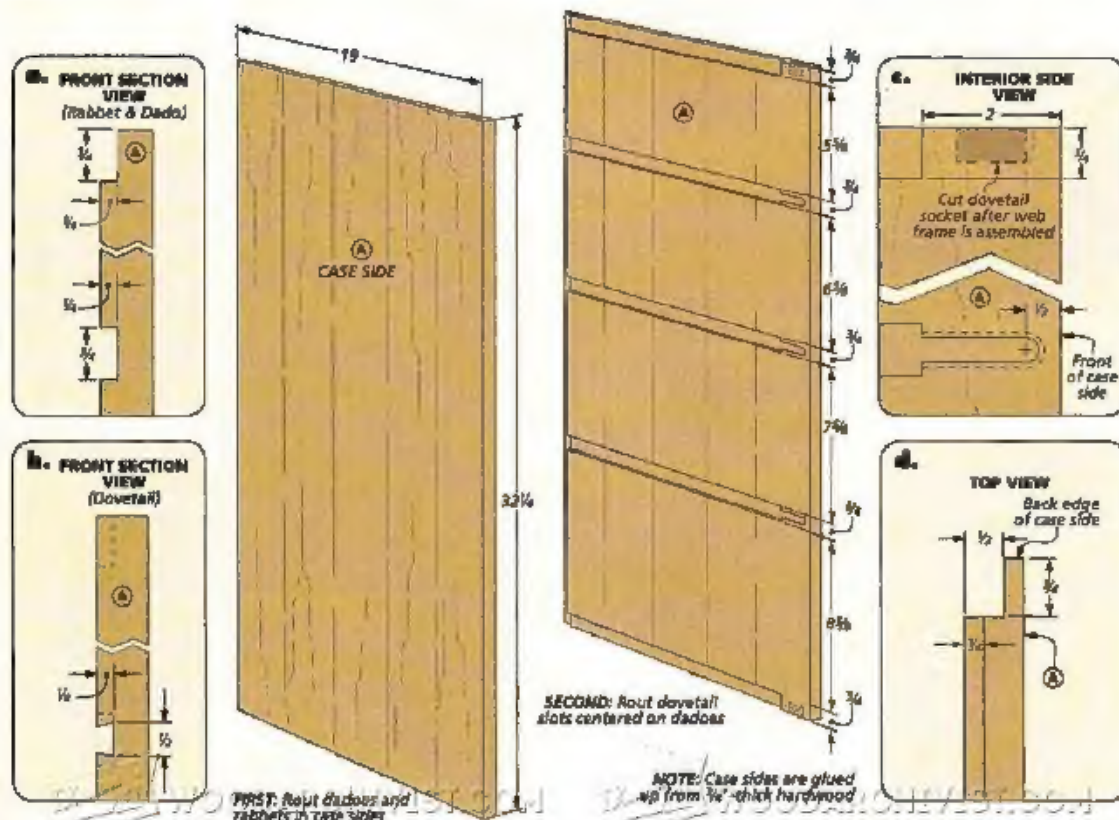
SLIDING DOVETAIL



DRAWER GUIDE SYSTEM



SIDE SECTION VIEW



starting the CASE

The project begins by assembling a case using traditional construction methods. The two solid-wood sides are connected by five web frames

that form the drawer openings. A frame and panel assembly encloses the back of the case. All the remaining details are added around (and inside) this solid foundation.

SIDE PANELS. The first step is a small one. You'll need to glue up two oversize panels for the sides of the case from 3/4"-thick stock. The sides will be prominent, so take

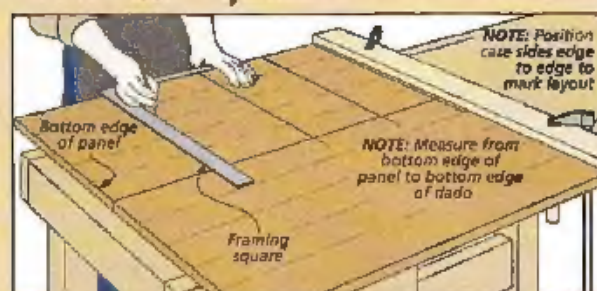
the time to get a good color and figure match. Once the glue is dry and the panels are cleaned up, you can cut them to final size.

JOINERY OVERVIEW. Now you can get started on the case joinery. This is where things get interesting. The goal is to end up with a rigid case while avoiding wood movement problems caused by the "cross-grain" construction between the case sides and web frames.

Here's how it's done. The three middle web frames are joined to the case sides with dado and sliding dovetail joints, as seen in the main drawing and detail 'c.' A stopped dado runs from the back edge of the side to within 2" of the front edge. Then a centered dovetail slot is cut to stop just short of the front edge (details 'b' and 'c').

A sliding dovetail on the end of the web frame's front rail locks into the slot in the case side while the remaining depth of the frame is held in the dado. The web frame is glued into the dovetail slot but allowed to "float" in the dado.

How-To: Lay Out the Dados



Side to Side. To ensure the dado layout on both sides matched up, I first marked the location of the bottom edge of each dado on one panel. Then I used these marks to lay out both sides at once.

The top and bottom frames use slightly different joinery. Here, stopped rabbets take the place of the dados, as shown in the main drawing and detail 'a' on the opposite page. And standard dovetail sockets cut into the top and bottom edges of the sides hold dovetails cut on the ends of the front rails. (You won't cut these dovetail sockets until after the web frames have been assembled.)

A DADO JIG. I know this may seem pretty involved, but there are a number of ways to streamline the job starting with the handy dado routing jig I used to cut most of the joinery in the case sides. The jig is shown in the drawings at right and the photo below. You'll find all the construction details in Shop Notebook on page 30.

In a nutshell, the router base is captured between two fences and rides on two hardboard plates. The jig is made so that the inside edges of the baseplates align with the $\frac{3}{4}$ " straight bit I used to cut the dados. This feature, along with a removable stop, allows you to use the jig to quickly rout the dados, rabbets, and the dovetail slots.

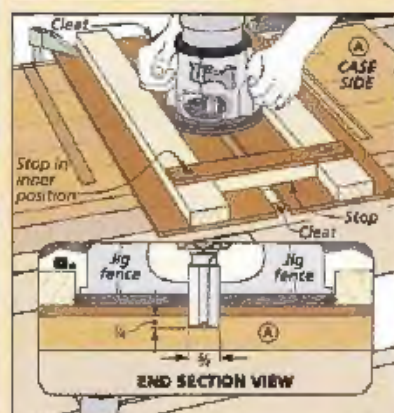
LAYOUT. Once the jig is ready to go, you can lay out the dados on the mirror-image sides (main drawing, opposite page). To end up with square drawer openings, the location of the joinery needs to be dead on from side to side. A good starting point is shown in the box on the opposite page. I measured on one side, then used these marks to lay out both sides at once.

THE DADOES. The box above shows how things go from there. I started by cutting the dados in both side panels. With the stop in the inner position and the jig aligned on your layout marks, you can cut each dado in a single pass.

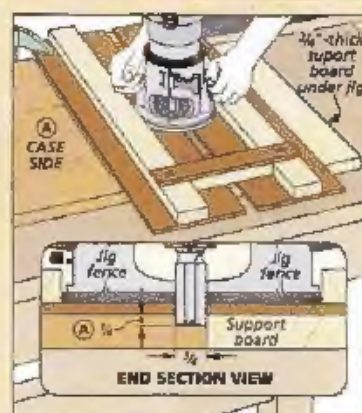
RABBETS. When cutting the rabbets, the only difference is that you'll need to add a support for the jig to your setup. The front end of the rabbets should align with the end of the dados so you don't need to move the stop.

DOVETAIL SLOTS. After squaring up the ends of the rabbets and dados

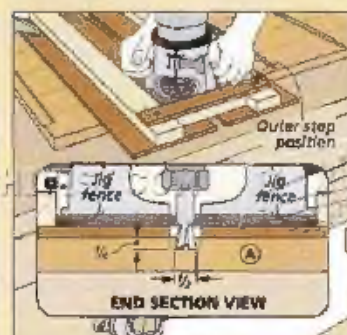
How-To: Dados, Rabbets, & Slots



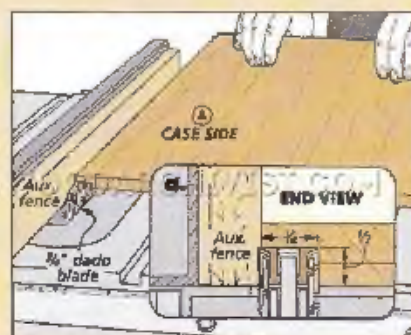
Precise Dados. To position the jig for the dado cuts, align the inside edge of the base with your layout line and clamp it down.



Rabbets. To rout the stopped rabbets, align the jig with the top and bottom edges of the case side and add a support piece.



Dovetail Slots. Simply align the jig with the previously cut dados. Then rout the dovetail slots in a single pass.



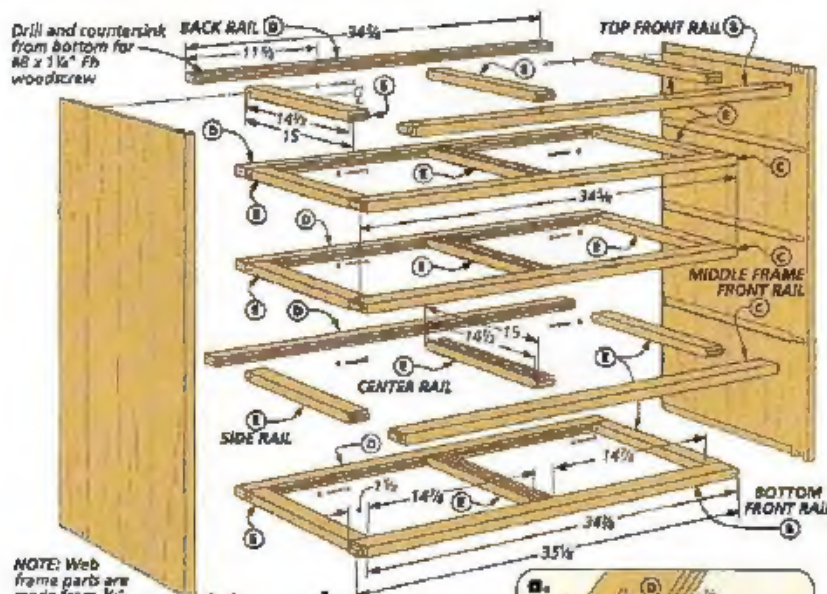
Back Rabbets. Cut the deep rabbets for the case back with a couple of passes across a wide dado blade buried in an auxiliary rip fence.

with a chisel, I switched to a 14° dovetail bit to cut the dovetail slots. First, you'll need to move the stop to the outer position. Then the jig can be positioned by simply aligning the edges of the baseplates with the previously cut dados. With the jig in place, the depth of cut can be adjusted by setting the router in the jig and lowering the bit until it bottoms out in the dado. Each slot is cut in a single pass.

BACK RABBETS. The last step is to rabbet the back edge of the sides to hold the back assembly. The final drawing above shows how I cut these deep rabbets using a dado blade in the table saw.



A This handy jig can be used to rout accurate dados, rabbets, and dovetail slots in the case sides. You'll find details on building the jig on page 30.



adding the WEB FRAMES

Now you can start work on the five web frames. The three middle frames are identical. The upper and lower frames are similar with a couple of significant differences.

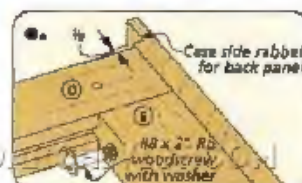
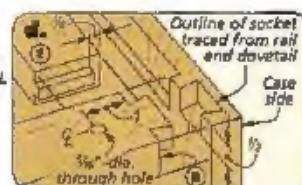
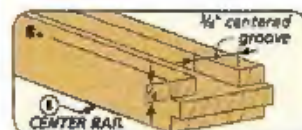
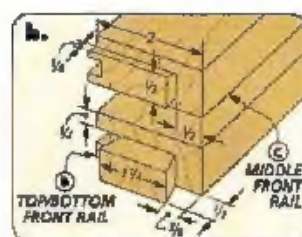
All the frames are made up of a front rail, a back rail, two side rails, and a center rail. Likewise, all the frames are constructed with the same stub tenon and groove joinery. So it makes sense to work on all the frames at once.

Before getting started, let me mention one important point.

The frames are sized to stop $\frac{1}{8}$ " short of the rabbets in the back edge of the sides. They're glued to the sides at the front and fastened with screws through oversized holes near the back. This lets the sides expand and contract freely.

CUT TO SIZE. First, I cut the frame pieces to size. Note that the front rails for the top and bottom frames are $\frac{1}{2}$ " longer. This accommodates the large dovetails on the ends.

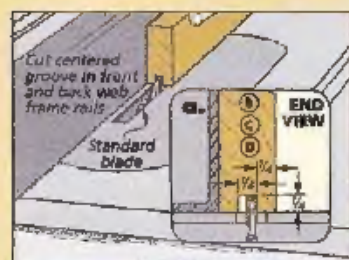
JOINTS. The box below and detail 'a' show the next steps. First I cut



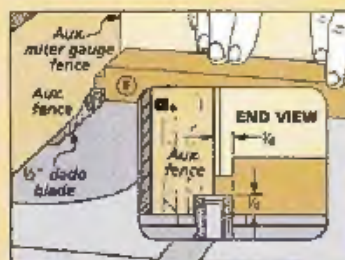
centered grooves in the front and back rails using a standard blade in the table saw. Then the stub tenons on the ends of the side and center rails can be cut with a dado blade buried in an auxiliary rip fence.

RUNNER GROOVE. The center rail of the four lower frames will hold a runner that mates with a guide on the underside of the drawers.

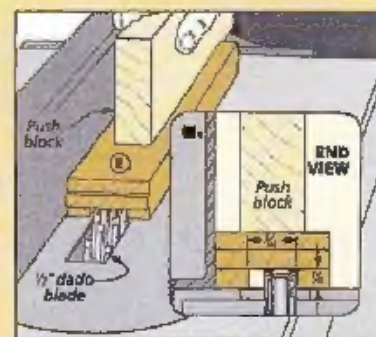
How-To: Grooves & Stub Tenon



Centered Grooves. Center the grooves in the front and back rails by flipping the pieces end-for-end between passes.



Stub Tenons. Sneak up on a snug fit to the grooves by tweaking the height of the blade after each pair of passes.



Runner Grooves. Install a dado blade in the saw to cut the centered grooves in the center rails. Flip the pieces between passes.

So while you have the dado blade installed, you can cut $\frac{1}{4}$ "-wide centered grooves in these rails. The How-To box on the opposite page gives you guidance.

SLIDING DOVETAILS. Next, the three middle front rails need a sliding dovetail cut on each end. The first drawing at right shows how I did this at the router table using a dovetail bit. A tall fence and a back-up block help steady the long rails. You're shooting for an accurate shoulder-to-shoulder length and a snug, but not overly tight, fit to the dovetail slots. To complete the rails, you'll trim back the front edge as shown in Figure 2.

STANDARD DOVETAILS. With this work completed, I turned my attention to the large dovetails needed on the ends of the top and bottom front rails. You can just follow the three-step process shown at right (Figures 3, 4, and 5).

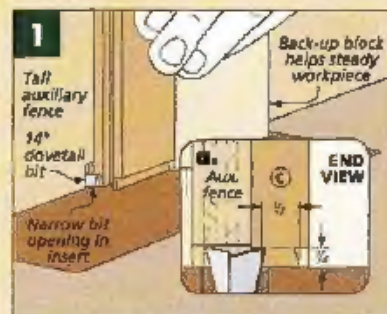
HOLES. Finally, you need to drill some screw holes. As I mentioned, all of the side rails get an oversized hole near the back (detail 'e', opposite). And the front/back and side rails of the top frame need countersunk holes for attaching the top. The holes in the front and side rails are oversized to allow for expansion and contraction.

ASSEMBLY. Now you can begin the assembly. First, I dry assembled each frame and marked the exact location of the center rail. Then, once the glue was applied, I made sure all the parts were aligned properly and the frames were square. The standard dovetails on the top and bottom frames should extend $\frac{1}{4}$ " proud of the side rails.

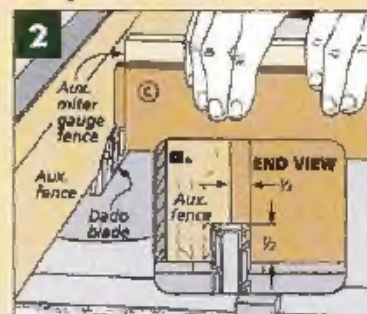
DOVETAIL SOCKETS. Before the case is assembled, the dovetail sockets for the top and bottom front rails have to be cut. I used the assembled frames to lay out the sockets as shown in Figure 6. You can finish the job with a back saw and a sharp chisel (Figures 7 and 8).

CASE ASSEMBLY. I started the assembly by gluing and fastening the top and bottom frames. Then you can slide the three middle frames in from the back. Remember, only the dovetail joints are glued.

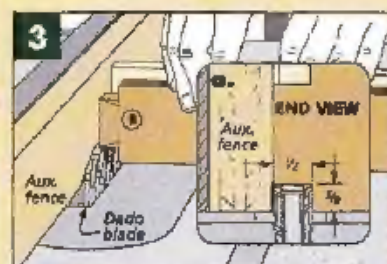
How-To: Dovetail Joinery



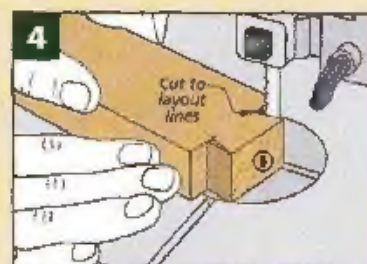
Sliding Dovetails. You'll hold the rails on end to rout the sliding dovetails. A tall fence and a back-up block help with control.



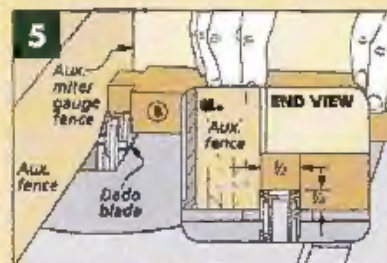
Shoulders. To complete the sliding dovetails, use the dado blade to cut shoulders on the front edge of the rails.



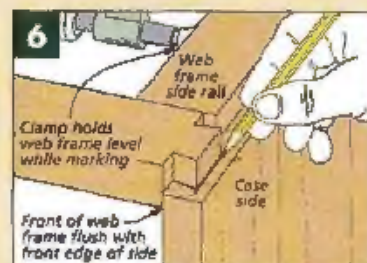
Standard Dovetails. After laying out the dovetails, I used a dado blade to establish the shoulders and remove the bulk of the waste.



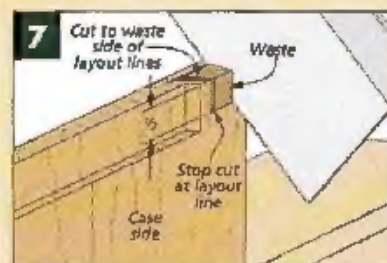
Angled Cuts. An easy way to complete the dovetails is to take the rails to the band saw. Cut right along your layout line.



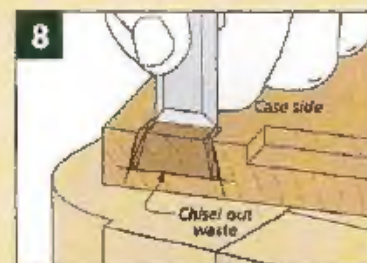
A Shoulder. To add racking resistance and make cutting the sockets easier, I cut a shoulder on the inside face of each dovetail.



Lay Out Sockets. You can clamp the assembled web frame to the case side to mark for the dovetail sockets.



A Saw Cut. To remove the waste from the dovetail socket, start by using a back saw to define the outside edges with an angled cut.



Chisel Out the Waste. Use alternating cuts from the face and the end to chip the waste from the dovetail socket.

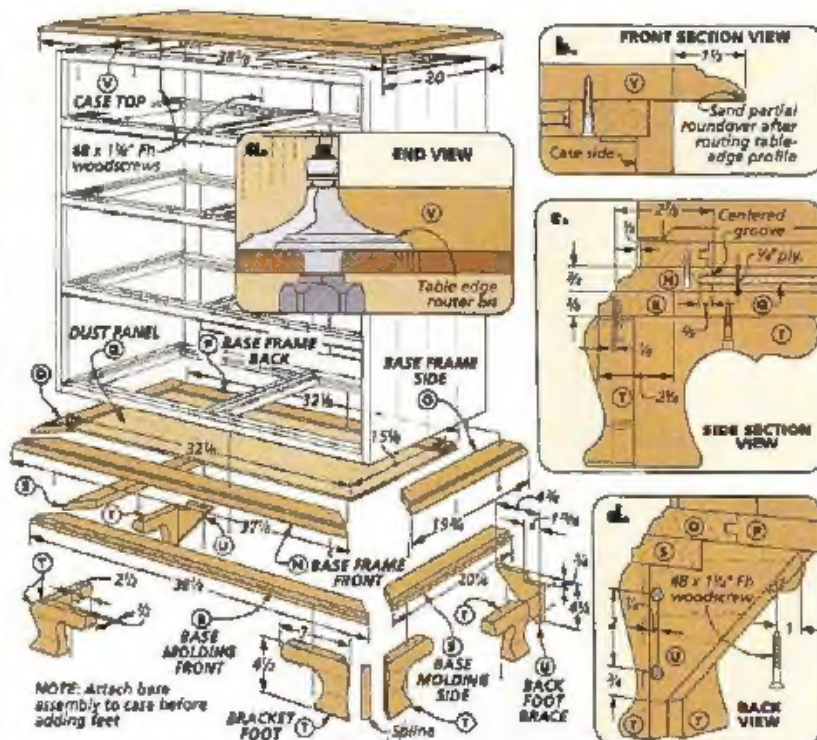
I made and installed the base assembly first. The assembly is built up from two separate layers, as you can see in the drawing and detail 'c' at right. The upper layer is a four-sided frame that includes a plywood dust panel. The lower layer simply consists of three pieces of molding that are mitered and glued around the front and sides of the upper frame.

BASE FRAME. The base frame uses miter joints in the front corners while the back rail is joined to the side rails with stub tenons. The dust panel is captured in grooves cut in all four pieces.

To build the frame, you just need to tackle things in the right order. After cutting all the pieces to width and rough length, you can cut grooves for the dust panel. Next, you want to miter the front corners and crosscut the sides to final length. Finally, cut the back rail to length and add the stub tenons.

Once the frame is glued up, the molding profiles can be routed. Leaving this for last makes clamping up the frame easier. The box below gives the details on this step. Then before starting on the base molding, I drilled the screw holes needed to attach the assembly.

BASE MOLDING. You can add the lower molding to the base frame one piece at a time. Here I reversed the order and routed the cove profile on the pieces before fitting and gluing them in place (How-To box below). Finally, to install the completed base assembly, I turned the case upside down.



BRACKET FEET. The next challenge is making the bracket feet. This is easier than you might think. You'll find step-by-step instructions starting on page 42. And when the feet are ready, glue and screw them in place (details 'c' and 'd').

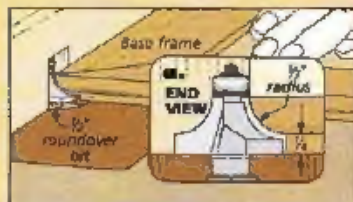
TOP. With the feet in place, the case can be turned upright to work on making and installing the top. First, you'll need to glue up an oversized panel from 1/4\"-thick stock. After cleaning it up, and trimming it to final size, you can add the thumb-nail and bead edge treatment.

This looks tricky, but a special "table edge" bit in the router table makes the job easy (detail 'a'). Just take light passes raising the bit in between.

The router bit leaves a sharp edge on the underside of the top. So I used sandpaper to soften it. Blend the thumbnail profile into a slight roundover as in detail 'b'.

The top is attached with screws through the holes in the top web frame (detail 'b'). Note that when flush at the back, the overhang on the front and sides is different.

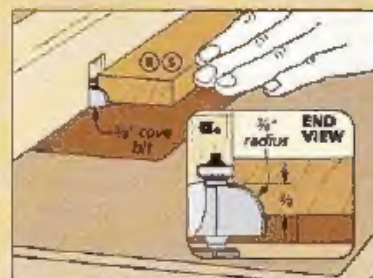
How-To: Base Frame & Molding Profiles



First, a Roundover. The base frame profile is routed in two steps. Start by routing a roundover on the front and sides.



A Small Cove. You'll complete the profile by routing a small cove into the shoulder left by the roundover bit.



A Larger Cove. The base molding is shaped before being fit. I routed a cove profile on the edge of the individual blanks.

the plywood bottoms to size and started the assembly.


INSTALL RUNNERS. With the drawer boxes assembled, it's time to complete the installation of the guides. First I used the guides to lay out the blind notches in the drawer fronts, as shown in the How-To box on the opposite page. Then I chiseled out the waste. Go easy so you don't split the narrow bridge at the front of the notch. When this is completed, you can install the

guides with a countersunk screw at each end (details 'b' and 'c').

STEM BUMPERS. One small detail and you're ready to veneer the fronts. I installed plastic stem bumpers in the topside of the backs near each corner. The stem bumpers make the drawers slide a little smoother.

VENEER. Adding the veneer to drawer fronts is actually pretty straightforward. My goal was to apply the veneer so that the figure would appear to run continuously

from one drawer front to another. I accomplished this by cutting the pieces in order from a large sheet of paper-backed veneer. And to simplify applying the veneer, I used contact adhesive to create an instant bond. You'll find more on the veneering process on page 31.

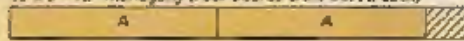
Once the drawer stops (detail 'd') and the period hardware are installed, it's into the finishing room. And a couple of days later out will come a true classic. 

Materials, Supplies & Cutting Diagram

A Case Sides (2)	$\frac{1}{4}$ " x 19" - 32 $\frac{1}{2}$ "
B Top/Btm. Web Frame Frt. Rails (2)	$\frac{3}{4}$ " x 2" - 35 $\frac{1}{2}$ "
C Mid. Web Frames Frt. Rails (3)	$\frac{1}{4}$ " x 2" - 34 $\frac{1}{2}$ "
D Web Frame Back Rails (5)	$\frac{3}{4}$ " x 1 $\frac{1}{2}$ " - 34 $\frac{1}{2}$ "
E Web Frame Side/Ctr. Rails (15)	$\frac{3}{4}$ " x 1 $\frac{1}{2}$ " - 15"
F Back Frame Side Stiles (2)	$\frac{3}{4}$ " x 2 $\frac{1}{2}$ " - 32 $\frac{1}{2}$ "
G Back Frame Ctr. Stile (1)	$\frac{3}{4}$ " x 2" - 28"
H Back Frame Rails (2)	$\frac{3}{4}$ " x 2 $\frac{1}{2}$ " - 30 $\frac{1}{2}$ "
I Back Frame Panels (2)	$\frac{1}{4}$ " ply. - 14 $\frac{1}{16}$ " x 28"
J Cock Bead (1)	$\frac{1}{8}$ " x $\frac{3}{4}$ " - 30 lin. ft.
K Drawer Runners (4)	$1\frac{1}{16}$ " x $\frac{3}{4}$ " - 15 $\frac{1}{2}$ "
L Drawer Slides (8)	$\frac{3}{16}$ " x $\frac{3}{4}$ " - 17"
M Drawer Kickers (8)	$\frac{1}{8}$ " x $\frac{3}{4}$ " - 17"
N Base Frame Front (1)	$\frac{3}{4}$ " x 2 $\frac{1}{16}$ " - 37 $\frac{1}{8}$ "
O Base Frame Sides (2)	$\frac{3}{4}$ " x 2 $\frac{1}{16}$ " - 19 $\frac{1}{2}$ "
P Base Frame Back (1)	$\frac{3}{4}$ " x 2 $\frac{1}{16}$ " - 32 $\frac{1}{8}$ "
Q Dust Panel (1)	$\frac{1}{4}$ " ply. - 15 $\frac{1}{8}$ " x 32 $\frac{1}{8}$ "
R Base Molding Front (1)	$\frac{3}{4}$ " x 2 $\frac{1}{4}$ " - 38 $\frac{1}{4}$ "
S Base Molding Sides (2)	$\frac{3}{4}$ " x 2 $\frac{1}{4}$ " - 20 $\frac{1}{4}$ "
T Bracket Foot Blanks (3)	$1\frac{1}{2}$ " x 4 $\frac{1}{2}$ " - 16"
U Back Foot Braces (2)	$\frac{3}{4}$ " x 4 $\frac{1}{4}$ " - 4 $\frac{1}{4}$ "
V Case Top (1)	$\frac{3}{4}$ " x 20" - 38 $\frac{3}{4}$ "
W Upper Drawer Front (1)	$\frac{3}{4}$ " x 5 $\frac{1}{4}$ " - 33 $\frac{1}{4}$ "
X Upper Drawer Sides (2)	$\frac{1}{2}$ " x 5 $\frac{1}{4}$ " - 17 $\frac{1}{4}$ "
Y Upper Drawer Back (1)	$\frac{1}{2}$ " x 5 $\frac{1}{4}$ " - 33 $\frac{3}{4}$ "
Z Upper Mid. Drawer Front (1)	$\frac{3}{4}$ " x 6 $\frac{1}{4}$ " - 33 $\frac{3}{4}$ "
AA Upper Mid. Drawer Sides (2)	$\frac{1}{2}$ " x 6 $\frac{1}{4}$ " - 17 $\frac{1}{4}$ "
BB Upper Mid. Drawer Back (1)	$\frac{1}{2}$ " x 6 $\frac{1}{4}$ " - 33 $\frac{3}{4}$ "
CC Lower Mid. Drawer Front (1)	$\frac{3}{4}$ " x 7 $\frac{1}{4}$ " - 33 $\frac{3}{4}$ "
DD Lower Mid. Drawer Sides (2)	$\frac{1}{2}$ " x 7 $\frac{1}{4}$ " - 17 $\frac{1}{4}$ "
EE Lower Mid. Drawer Back (1)	$\frac{1}{2}$ " x 7 $\frac{1}{4}$ " - 33 $\frac{3}{4}$ "
FF Lower Drawer Front (1)	$\frac{3}{4}$ " x 8 $\frac{1}{4}$ " - 33 $\frac{3}{4}$ "
GG Lower Drawer Sides (2)	$\frac{1}{2}$ " x 8 $\frac{1}{4}$ " - 17 $\frac{1}{4}$ "
HH Lower Drawer Back (1)	$\frac{1}{2}$ " x 8 $\frac{1}{4}$ " - 33 $\frac{3}{4}$ "
I Drawer Bottoms (4)	$\frac{1}{4}$ " ply. - 37" x 33 $\frac{1}{4}$ "
J Drawer Guides (4)	$\frac{1}{2}$ " x 15 $\frac{1}{8}$ " - 17 $\frac{1}{2}$ "
KK Drawer Stops (8)	$\frac{1}{2}$ " x $\frac{1}{2}$ " - 1"

- (8) Rosette Bail Pulls
- (4) Keyhole Escutcheons
- (8) Plastic Stem Bumpers
- (1) 4' x 8' Ribbon-Figure Mahogany Veneer
- (10) #8 x 2" Rh Woodscrews w/Washers
- (34) #8 x 1 $\frac{1}{4}$ " Fh Woodscrews
- (8) #6 x $\frac{3}{4}$ " Fh Woodscrews

$\frac{1}{4}$ " x 5' - 72" Mahogany (Four Boards @ 2.5 Bd. Ft. Each)



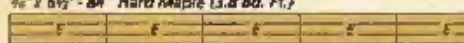
$\frac{1}{4}$ " x 6 $\frac{1}{2}$ " - 72" Mahogany (3.3 Bd. Ft.)



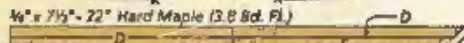
$\frac{1}{4}$ " x 6 $\frac{1}{2}$ " - 72" Mahogany (3.1 Bd. Ft.)



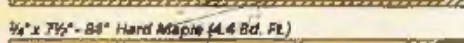
$\frac{1}{4}$ " x 6 $\frac{1}{2}$ " - 84" Hard Maple (3.8 Bd. Ft.)



$\frac{1}{4}$ " x 7 $\frac{1}{2}$ " - 72" Hard Maple (3.8 Bd. Ft.)



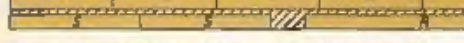
$\frac{1}{4}$ " x 7 $\frac{1}{2}$ " - 84" Hard Maple (4.4 Bd. Ft.)



$\frac{1}{4}$ " x 7 $\frac{1}{2}$ " - 84" Mahogany (4.4 Bd. Ft.)



$\frac{1}{4}$ " x 6 $\frac{1}{2}$ " - 84" Mahogany (Two Boards @ 3.8 Bd. Ft. Each)



$\frac{1}{4}$ " x 7" - 84" Mahogany (4.1 Bd. Ft.)



$\frac{1}{4}$ " x 9" - 72" Mahogany (4.5 Bd. Ft.)



$\frac{1}{2}$ " x 7" - 72" Hard Maple (3.5 Sq. Ft.)



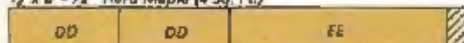
$\frac{1}{2}$ " x 7" - 72" Hard Maple (3.5 Sq. Ft.)



$\frac{1}{2}$ " x 8" - 72" Hard Maple (4 Sq. Ft.)



$\frac{1}{2}$ " x 9" - 72" Hard Maple (4.5 Sq. Ft.)



ALSO NEEDED: One 48" x 96" sheet of $\frac{1}{4}$ " Maple plywood.
One 24" x 48" sheet of $\frac{1}{8}$ " Maple plywood